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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,948	09/29/2003	Koji Hasegawa	0171-1023P	8310

2292 7590 09/02/2005

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EXAMINER

LEE, SIN J

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 09/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/671,948

Applicant(s)

HASEGAWA ET AL.

Examiner

Sin J. Lee

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. In view of the amendment of June 24, 2005, previous 102(e) rejection on claims 18-22 over Nishi et al'101 is hereby withdrawn.
2. Due to newly cited prior arts, the following rejections are made non-final.

Claim Rejections - 35 USC § 102

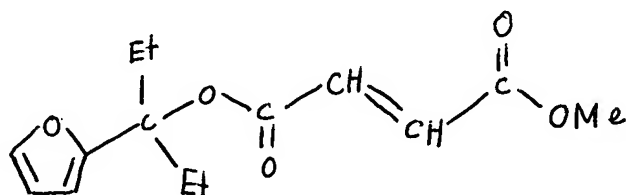
3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Jung et al (Chemical Abstract 1991:61346 for Journal of the American Chemical Society, (1991) 113(1), pg.224-32).

Jung et al teaches (see the last page of the chemical abstract) the following compound

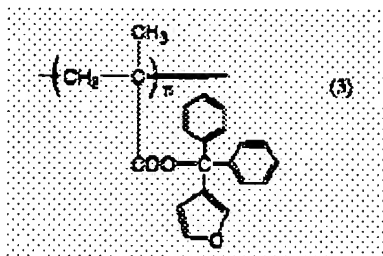


, and this compound teaches present compound of formula (1) of claim 1 (present A¹ being a polymerizable double bond substituted with –C(=O)-OMe group).

5. Claims 1, 4, 13, 14, 16 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Nio et al (JP 2002-156760 and its JPO English abstract).

Nio teaches (see abstract) a positive photosensitive composition containing a polymeric compound having a carboxyl group protected with an acid releasable group (the acid releasable group having 3 or more aromatic rings) and a photoacid generator. Nio also teaches a method for producing a resist pattern using his composition.

As an example for his polymer, Nio discloses the following (see [0034] of the Japanese document):



There is no language in present claims, which excludes a phenyl group as R1 or R2 (a phenyl group is still a cyclic monovalent hydrocarbon group having 6 carbon atoms). Therefore, Nio teaches present inventions of claims 1, 4, 13, 14, 16 and 17.

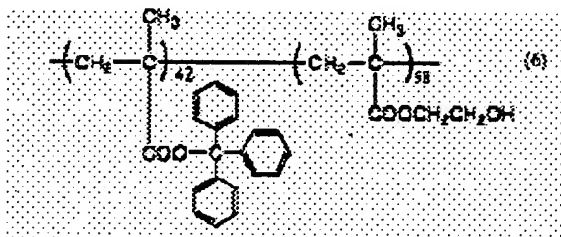
Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
7. Claims 1, 4, and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nio et al (JP 2002-156760 and its JPO English abstract).

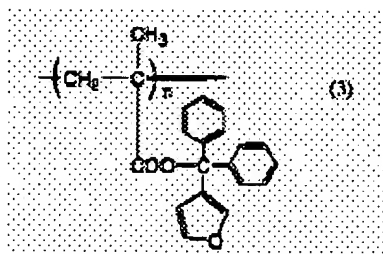
As discussed above, in Paragraph 5, Nio teaches (see abstract) a positive photosensitive composition containing a polymeric compound having a carboxyl group protected with an acid releasable group (the acid releasable group having 3 or more

aromatic rings) and a photoacid generator. Nio also teaches a method for producing a resist pattern using his composition.

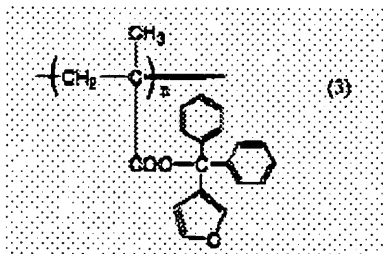
As an example for his polymer, Nio discloses the following (see [0040] of the Japanese document):



Nio also teaches (see [0009] of the Japanese document) the equivalence of the first repeat unit shown above and the following repeat unit



Therefore, it would have been obvious to one skilled in the art to replace the first repeat unit of the copolymer shown above with the following repeat unit

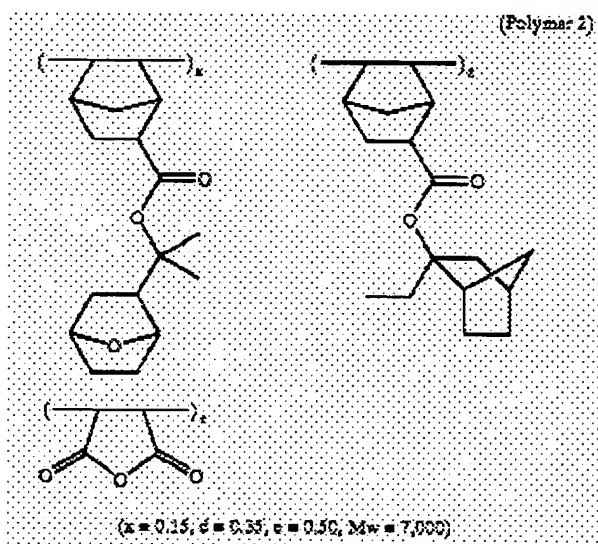


with a reasonable expectation of obtaining positive photosensitive composition having high sensitivity. Thus, Nio's teaching renders obvious present inventions of claims 1, 4, and 13-17 (with respect to present claim 15, the second repeat unit of the copolymer

shown above teaches present repeat unit (M1) of claim 15 in which R⁰⁰⁴ is a monovalent hydrocarbon group of 2 carbon atoms having a hydroxyl group).

8. Claims 1 and 3-8 are rejected under 35 U.S.C. 103(a) as being obvious over Nishi et al (US 2002/0132182 A1) in view of Hasegawa et al (US 6,774,258 B2).

Nishi's Polymer 2, which is shown in [0201], has the following structure;



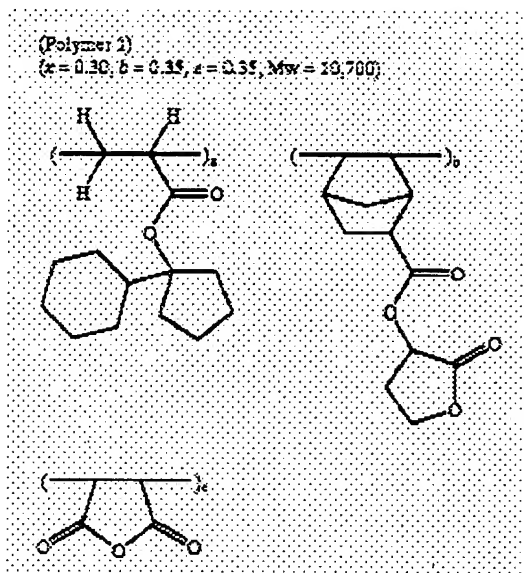
In Example I-2 (see Table 1), Nishi teaches a resist composition containing the polymer shown above. After spin-coating the resist composition onto a silicon wafer and heat-treating at 110°C for 90 seconds, Nishi expose the silicon wafer to KrF excimer laser stepper, heat-treat at 110°C for 90 seconds, and then develops for 60 seconds to form a resist pattern (see [0204]).

In the first repeat unit shown above, the $-\text{C}(=\text{O})\text{O}-\text{C}(\text{CH}_3)_2-$ moiety is represented by the variable "W" in Nishi's generic formula (1-1) (see [0010]-[0011]). Nishi defines "W" as a straight-chain or branched divalent hydrocarbon radical having 2 to 10 carbon atoms, which may have one or more ester linkages in its structure. The moiety of –

$\text{C(=O)O-C(CH}_3)_2\text{-}$ in the first repeat unit shown above is a *branched* divalent hydrocarbon radical having 3 carbon atoms which has one ester linkage in its structure. Based on the reading of Nishi's definition of "W", it is the Examiner's position that it would have been obvious to one of ordinary skill in the art to substitute $\text{-C(=O)O-C(CH}_2\text{CH}_3)(\text{CH}_2\text{CH}_3)\text{-}$ (which is a branched divalent hydrocarbon radical having 5 carbon atoms which has one ester linkage in its structure) for $\text{-C(=O)O-C(CH}_3)_2\text{-}$ because both of the moieties are within the definition of "W" given by Nishi. *Besides, a methyl group and an ethyl group are art-known, chemically equivalent functional groups as evidenced by Hasegawa et al, col.3, lines 1-24.* Therefore, based on the teachings of Nishi in view of Hasegawa, it is the Examiner's position that it would have been obvious to one of ordinary skill in the art to substitute $\text{-C(=O)O-C(CH}_2\text{CH}_3)(\text{CH}_2\text{CH}_3)\text{-}$ for $\text{-C(=O)O-C(CH}_3)_2\text{-}$ in the first repeat unit of the polymer shown above with a reasonable expectation of obtaining a resist material which not only exhibits excellent properties such as sensitivity, resolving power and etching resistance, but also undergoes a well-controlled degree of swelling. Therefore, Nishi in view of Hasegawa would render obvious present inventions of claims 1 and 3-8.

9. Claims 1, 4, and 13-23 are rejected under 35 U.S.C. 103(a) as being obvious over Hasegawa et al (US 2001/0044071) in view of Chiba et al (US 6,280,900 B1).

Hasegawa teaches the following polymer (Polymer 1) in [0172]:



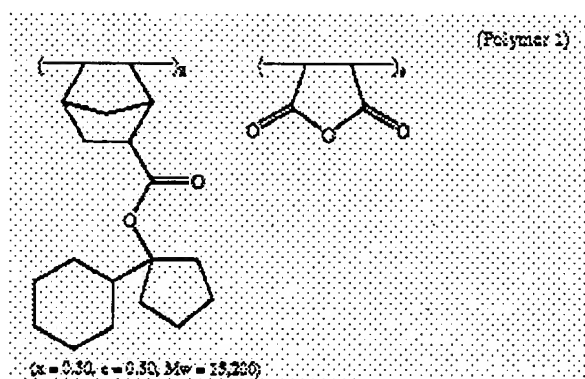
Hasegawa teaches a resist composition containing Polymer 1 and a photoacid generator in Example 1 (see Table 1). Hasegawa spin-coats his resist composition solution onto a silicon wafer and then bakes the coated resist composition solution to give a resist film. The resist film is exposed using ArF laser and then baked and puddle developed to give a resist pattern (see [0180]).

The first repeat unit of the polymer shown above does not include present furandiyl, tetrahydrofurandiyl or oxanorbornanediyl group. However, it is well known in the art that the *cyclohexyl* group shown in the first repeat unit of the above polymer and a tetrahydrofuranyl group are equivalent cyclic acid-decomposable groups as evidenced by Chiba et al, col.15, lines 26-31. Because the *cyclohexyl* group and a tetrahydrofuranyl group were art-recognized equivalents at the time the invention was made, it would have been obvious to one of ordinary skill in the art to substitute the tetrahydrofuranyl group for the *cyclohexyl* group in the first repeat unit of Hasegawa's polymer shown above. Such polymer teaches present polymer which is made from the

present ester compound of formula (1) (specifically, *the 21st ester compound* shown in present claim 18). Therefore, Hasegawa in view of Chiba would render obvious present inventions of claims 1, 4, and 13-23.

10. Claims 1, 4-8, and 18-23 are rejected under 35 U.S.C. 103(a) as being obvious over Hasegawa et al (US 2002/0004178 A1) in view of Chiba et al (US 6,280,900 B1).

Hasegawa teaches the following polymer (Polymer 1) in [0174]:



Hasegawa teaches a resist composition containing Polymer 1 and a photoacid generator in Example I-1 (see Table 1). Hasegawa spin-coats his resist composition solution onto a silicon wafer and then bakes the coated resist composition solution to give a resist film. The resist film is exposed using KrF laser and then baked and developed to give a positive resist pattern (see [0179]).

The first repeat unit of the polymer shown above does not include present furandiyl, tetrahydrofurandiyl or oxanorbornanediyl group. However, it is well known in the art that the *cyclohexyl* group shown in the first repeat unit of the above polymer and a tetrahydrofuranyl group are equivalent cyclic acid-decomposable groups as evidenced by Chiba et al, col.15, lines 26-31. Because the *cyclohexyl* group and a tetrahydrofuranyl group were art-recognized equivalents at the time the invention was

made, it would have been obvious to one of ordinary skill in the art to substitute the tetrahydrofuranyl group for the *cyclohexyl* group in the first repeat unit of Hasegawa's polymer shown above. Such polymer teaches present polymer which is made from the present ester compound of formula (1) (specifically, the 20th ester compound shown *from the end of present claim 18*). Therefore, Hasegawa in view of Chiba would render obvious present inventions of claims 1, 4-8, and 18-23.

Double Patenting

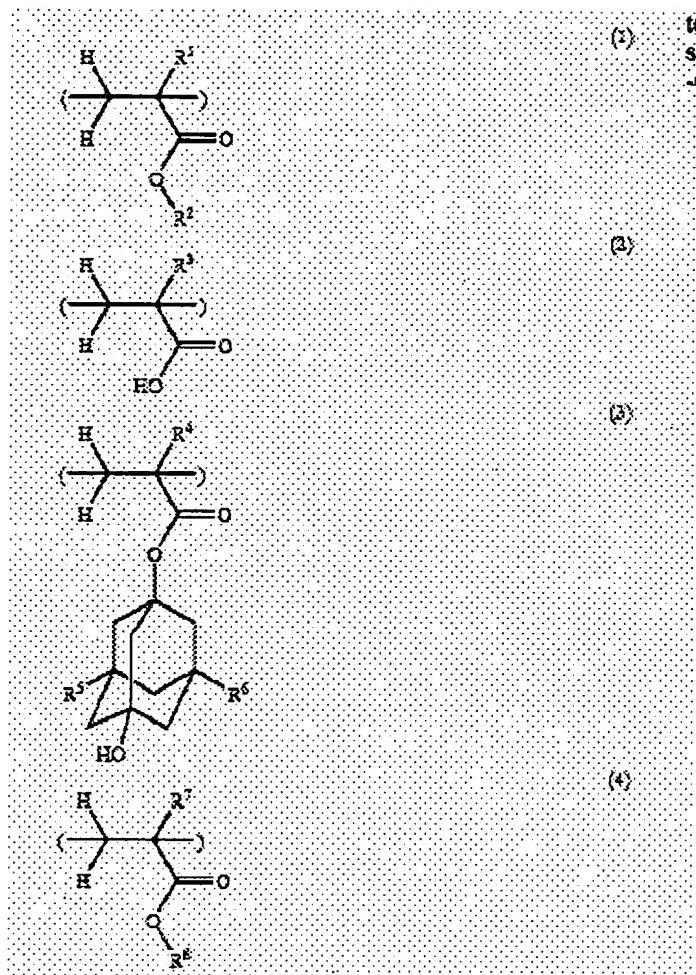
11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

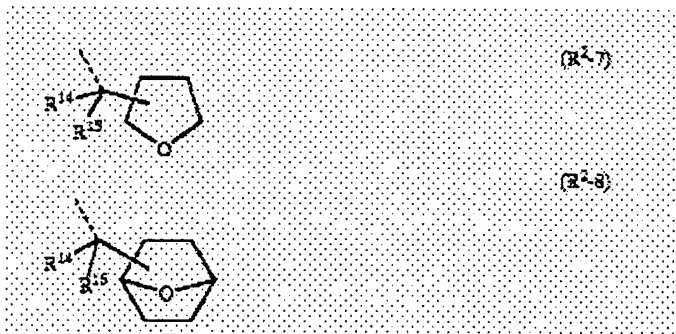
Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Claims 1, 2, 4, and 9-23 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 4, 9 and 10 of copending Application No. 10/936,753. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

Claim 1 of App.'753 teaches a polymer comprising the following recurring units;



In claim 4, App.'753 teaches that R^2 in the formula (1) shown above can be represented by at least one of the following formulas;



in which R^{14} and R^{15} are independently a straight, branched or cyclic C_1 - C_{10} alkyl group. Based on this teaching, it would have been obvious to one skilled in the art to have R^{14}

and R¹⁵ to be a straight C₁₀ alkyl group because C₁₀ is clearly shown as the higher end of the taught range. Therefore, App.'753 renders obvious present inventions of claims 1, 2, 4, 9, 10, and 13-15. Also, claims 9 and 10 of App.'753 renders obvious present inventions of claims 11, 12, 16 and 17. Also, claim 4 of App.'753 teaches that R¹⁴ and R¹⁵, taken together, may form a ring with the carbon atom to which they are bonded. Therefore, App.'753 renders obvious present invention of claim 23 as well.

With respect to present claim 18, as discussed above, claim 4 of App.'753 teaches that R¹⁴ and R¹⁵ of (R2-7) and (R2-8) are independently a straight, branched or cyclic C₁-C₁₀ alkyl group. Based on this teaching, it would have been obvious to one skilled in the art to have R¹⁴ and R¹⁵ to be a straight C₁ alkyl group because C₁ is clearly shown as the lower end of the taught range. Therefore, App.'753 renders obvious present inventions of claims 18-22.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

13. Applicants argue that Nishi'579 does not teach or suggest the use of a monomer in which R1 and R2 are both at least ethyl groups in Formula (1) of claim 1 or in Formulas (1b) and (1c) in claim 5.

However, as already discussed above, based on the reading of Nishi's definition of "W" (a straight-chain or branched divalent hydrocarbon radical having 2 to 10 carbon atoms), it is still the Examiner's position that it would have been obvious to one of ordinary skill in the art to substitute -C(=O)O-C(CH₂CH₃)(CH₂CH₃)- (which is a

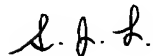
branched divalent hydrocarbon radical having 5 carbon atoms which has one ester linkage in its structure) for $-\text{C}(=\text{O})\text{O}-\text{C}(\text{CH}_3)_2-$ in the first repeat unit of Nishi's Polymer 2 because both of the moieties are within the definition of "W" given by Nishi. *Besides, a methyl group and an ethyl group are art-known, chemically equivalent functional groups.* Therefore, based on the teachings of Nishi in view of Hasegawa, it is still the Examiner's position that it would have been obvious to one of ordinary skill in the art to substitute $-\text{C}(=\text{O})\text{O}-\text{C}(\text{CH}_2\text{CH}_3)(\text{CH}_2\text{CH}_3)-$ for $-\text{C}(=\text{O})\text{O}-\text{C}(\text{CH}_3)_2-$ in the first repeat unit of Nishi's Polymer 2 with a reasonable expectation of obtaining a resist material which not only exhibits excellent properties such as sensitivity, resolving power and etching resistance, but also undergoes a well-controlled degree of swelling.

With respect to applicants' argument against US 2001/0044071 (Hasegawa et al) or US2002/0004178 (Hasegawa et al) in view of Chiba'900, the Examiner would like to note that *the Examiner meant to say* that Chiba makes it obvious to substitute a tetrahydrofuranyl group for the *cyclohexyl* group (instead of cyclopentyl group) in the first repeat units of the polymers disclosed by the primary references, and as explained above in Paragraphs 9 and 10, the prior arts' teachings render obvious present inventions of those rejected claims.

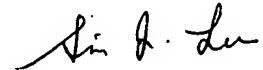
14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



S. Lee
August 19, 2005



SIN LEE
PRIMARY EXAMINER